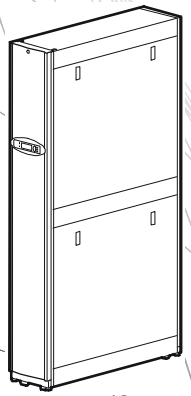
APC
by Schneider Electric

Installation

InRow® RD 10kW Air Cooled

ACRD100
ACRD101



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General Information

Overview

Save these instructions

This manual contains important instructions that must be followed during the installation of this equipment.

Safety symbols that may be used in this manual

Electrical Hazard: Indicates an electrical hazard which, if not avoided, could result in injury or death.

Danger: Indicates a hazard which, if not avoided, could result in severe personal injury or death.

Warning: Indicates a hazard which, if not avoided, could result in personal injury or damage to product or other property.

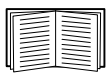
Heavy: Indicates a heavy load that should not be lifted without assistance.

Caution: Indicates a potential hazard which, if not avoided, could result in damage to the equipment or other property.

Tip Hazard: This equipment is easily tipped. Use extreme caution when unpacking or moving.

Note: Indicates important information.

Cross-reference symbol used in this manual



See another section of this document or another document for more information on this subject.

Safety

Note: All work should be performed by American Power Conversion (APC®) authorized personnel only. Follow all local and national codes and regulations when installing this equipment.

Caution: Keep your hands, clothing, and jewelry away from moving parts. Check the equipment for foreign objects before closing the doors and starting the equipment.

Heavy: The equipment is heavy. For safety purposes, at least two people must be present when moving or installing this equipment.

Tip Hazard: This equipment has a high center-of-gravity. Always use two persons when moving equipment. Use extreme caution when unpacking and moving. When using a forklift to move the equipment, make sure to lift only from the bottom.

Electrical Hazard: Only a licensed electrician may connect the equipment to utility power.

Electrical Hazard: Do not wear jewelry when working near energized components.

Warning: The equipment operates under pressure (5.5–38 bar, 80–550 psig) and is charged with R-410A refrigerant. Take proper safety precautions when servicing the refrigerant loop and read the R-410A Material Safety Data Sheet (MSDS) for safe handling of the refrigerant.

Inspecting the Equipment

Your American Power Conversion (APC®) InRow™ RD air conditioner has been tested and inspected for quality assurance before shipment from APC. Carefully inspect both the exterior and interior of the equipment immediately upon receipt to ensure that the equipment has not been damaged during transit.

Verify that all parts ordered were received as specified and that the equipment is the correct type, size, and voltage.

Filing a claim. If damage is identified on receipt of the equipment, note the damage on the bill of lading and file a damage claim with the shipping company. Contact APC Worldwide Customer Support at one of the numbers listed on the back cover of this manual for information about filing a claim with the shipping company. The shipping claim must be filed at the receiving end of the delivery.

Note: In case of shipping damage, do not operate the equipment. Keep all packaging for inspection by the shipping company.

Storing the Equipment Before Installation

If the equipment will not be installed immediately, store it in a safe place, protected from the weather.

Caution: Leaving the equipment uncovered and exposed to possible damage from the environment will void the factory warranty.

Moving the Equipment

Moving the equipment to its final location

The recommended tools for moving the equipment **while it is still on the pallet** include the following:

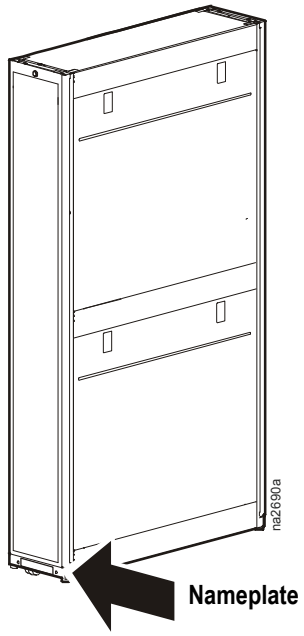
Pallet jack Forklift

Tip Hazard: The equipment can be rolled to its final location using its casters if the floor is smooth and clean. Be sure two people move the equipment.

Model Identification

The model number can be found on the outside of the shipping crate and on the nameplate located on the rear of the equipment as shown. Use the table below to verify that the equipment is the correct type and voltage.

Model	Configuration	Voltage	Air Pattern
ACRD100	Air-cooled	208-240/1~/60 Hz	Back to front
ACRD101	Air-cooled	220-240/1~/50 Hz	Back to front



Component Identification

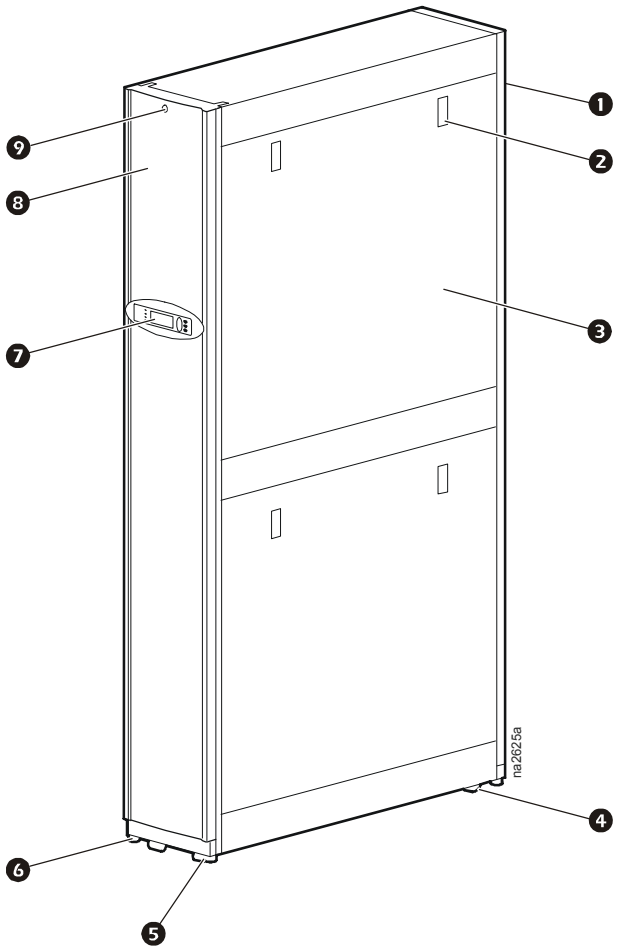
Install kit

Note: Do not discard the install kit.

The install kit contains items which may be necessary to complete the installation of your equipment. Some items are the literature, floor brackets, and hardware to facilitate joining the equipment to enclosures.

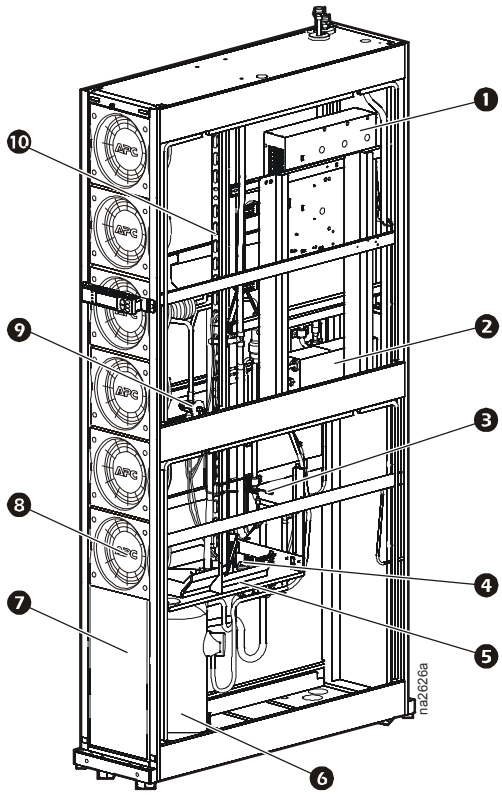
Item	Quantity	Item	Quantity
Cable assembly, thermistor/probe - 13ft	1	Resistor, 150 ohm, 1/4 watt	1
Netshelter SX bolt-down kit	1	Screw, flat head Philips M5 x 12	4
Teflon ring (for Rotolock)	4	Key	2
Wire clip, thermistor probe	3	Nylon push mount, 1-1/4-in diameter	8

Exterior components (front)



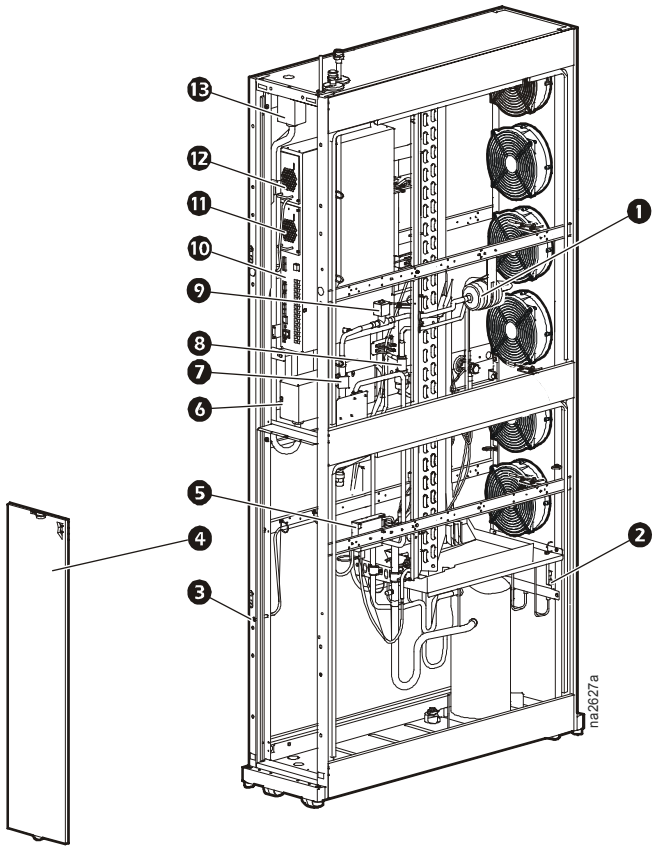
1. Removable rear door
2. Side panel latch
3. Removable side panel
4. Rear casters (non-swiveling)
5. Front casters (swiveling)
6. Adjustable leveling foot
7. Display interface
8. Removable front door
9. Door lock

Interior components (front)



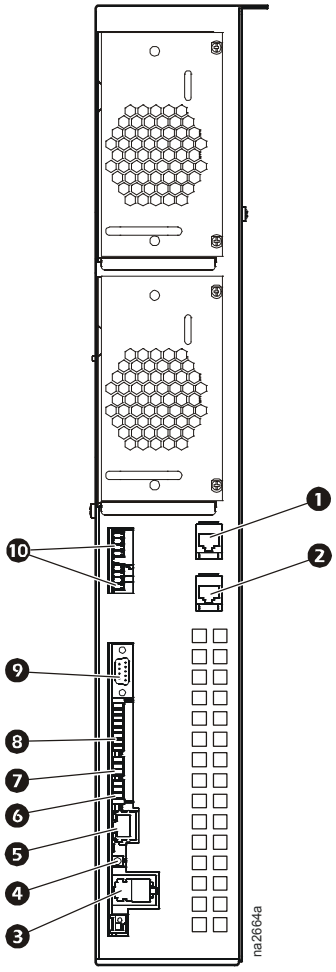
❶	Electrical control box 1	❻	Compressor
❷	Electrical control box 2	❼	Front air block panel
❸	Temperature sensor (7 total)	❽	Evaporator fans (6)
❹	Condensate pan floats (2)	❾	Expansion valve
❺	Condensate pan	❿	Evaporator coil

Interior components (rear)



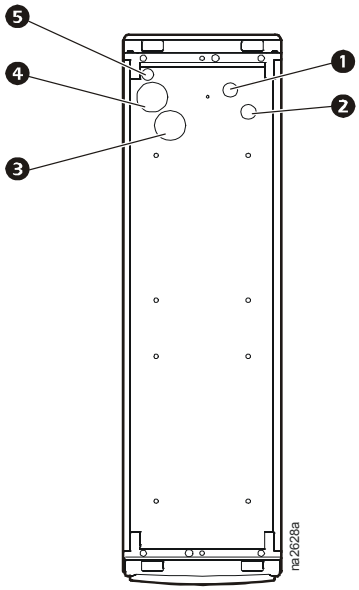
1. Filter/dryer
2. Pressure transducer (2) (located behind air block)
3. Filter differential pressure port
4. Air filter (2)
5. Condensate pump (2)
6. Electrical contol box 2
7. Sight glass
8. Hot gas bypass valve
9. Liquid line shutoff solenoid
10. Electrical control box 1
11. Power supply unit #2
12. Power supply unit #1
13. Service junction box (top entry shown)

Electrical panel



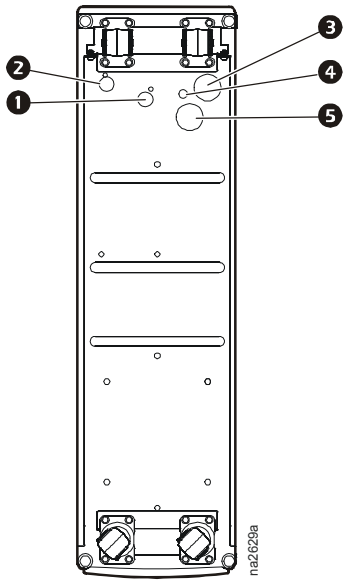
❶	Leak detector port	❻	Building management system (BMS) RS-485 port
❷	Remote temperature sensor port	❼	Control RS-485 port
❸	A-Link ports	❽	Form C and shutdown input
❹	Reset button	❾	RS-232 console port
❺	Network port	❿	Outdoor heat exchanger (OHE) ports (optional)

Top piping and power access locations



1. Electrical input
2. Low voltage wiring inoput
3. Hot gas line
4. Liquid line
5. Condensate pump outlet

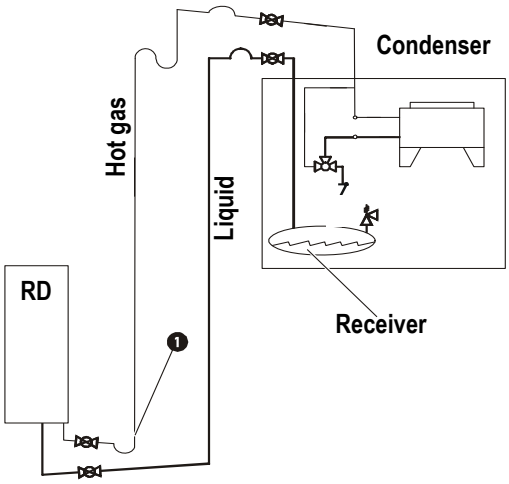
Bottom piping and power access locations



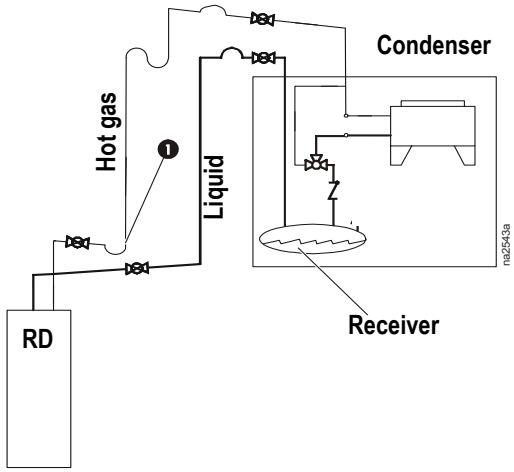
1. Electrical input
2. Low voltage wiring input
3. Liquid line
4. Condensate pump outlet
5. Hot gas line

Refrigeration Piping Diagram

Bottom piping



Top piping



Note: Shutoff valves shown nearest to the condensers are not supplied by APC.

❶	Pitch in direction of refrigerant flow; 4 mm per m (1/2-in per 10 ft)		Check valve
❷	Reduction of piping diameter for vertical piping run (if necessary)		P-trap
❸	Schrader valve		S-trap
	Shutoff valves		Inverted P-trap
	Head pressure control valve		

Note: Route piping through the top or bottom of the InRow RD.

Note: All lines are Type L ACR copper tubing.

Note: Trap the vertical discharge line every 6 m (20 ft) to ensure proper oil return.

Note: Change the size of the pipe after the P-trap. See the piping diagram created for your site.

Note: The maximum piping run is 61 m (200 ft) equivalent length. Size the piping pursuant to accepted refrigeration practice.

Warning: Do not install the air-cooled condenser below the InRow RD. The condenser must be positioned above or at the same level as the InRow RD to ensure proper function.

Connections Overview

All connections to and from the equipment can be made through either the top or the bottom of the equipment. Once the corresponding connectors are sweated or brazed into place, the equipment can be disconnected without soldering, welding, or gluing. See the following tables for information about the sizes and types of connectors.

Warning: Make electrical connections in accordance with all local and national codes.

Note: FOR INSTALLATION IN CHINA ONLY - 电源外接导线长度不超过2m时其横截面积不得小于 2.5mm^2，超过 2m 按国家和地方规定加大导线规格，其规格应不轻于 IEC227 的 53 号线。

Power connections

Model	Voltage	Frequency (Hz)	MCA	MOP	FLA	LRA (Compressor)
ACRD100	208-240	60	25	40	N/A	87.5
ACRD101	220-240	50	N/A	N/A	21	N/A

Above data is based on maximum operating conditions.
Consult local and national codes for wire size, conduit requirements and overload protection.
MCA - Minimum Circuit Ampacity
MOP - Maximum Overcurrent Protection
FLA - Full Load Amps
LRA - Locked Rotor Amps

Piping connections

Connection	Type	ACRD100/101
Refrigerant discharge	1-in Rotalock*	1/2-in OD
Refrigerant liquid	1-in Rotalock*	1/2-in OD
Condensate drain		3/16-in ID 5/16-in OD

* Use the provided Teflon® gasket to prevent leakage. Tighten the Rotalock nut to 75 Nm (55 lb-ft).

Room Preparation

Air distribution

The equipment distributes air in a back-to-front discharge pattern, removing hot air from a hot aisle and discharging cooled air into a cold aisle.

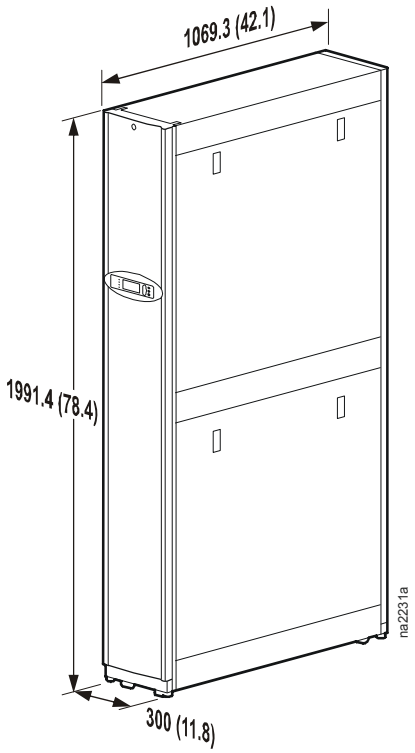
Note: The equipment is designed for free air discharge or for use with the Rack Air Containment System or Hot Aisle Containment System. The equipment is not intended to be connected to a duct system.

Incoming power supply requirements

Electrical Hazard: Electrical service must conform to local and national electrical codes and regulations. The equipment must be grounded.

Weights and Dimensions

Model	Packed weight	Unpacked weight
ACRD100, ACRD101	221 kg (488 lb)	183 kg (404 lb)



Dimensions are shown in mm (in).

Installation

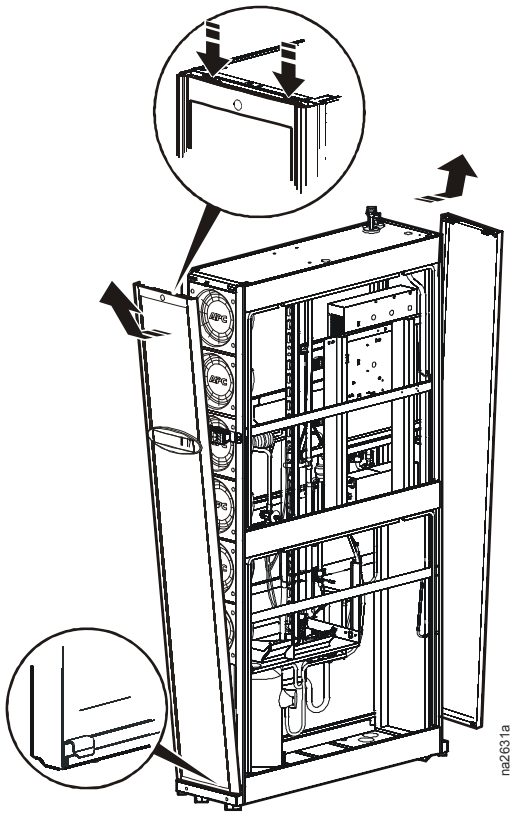
Removing Doors and Panels

Door removal

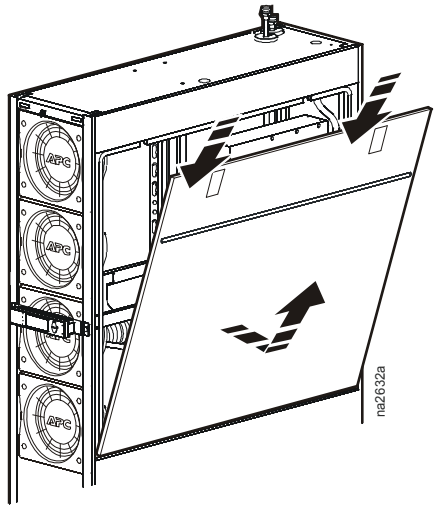
Warning: All doors and side panels must be locked during normal operation. Do not open the side panels while the fans are operating.

Caution: Use caution when removing the front and rear doors while the equipment is operating. Unplug the display interface cables.

Note: Do not lean the doors against a wall with the side panel latches facing the wall. This can deform the latches and prevent them from properly working.



Side panel removal



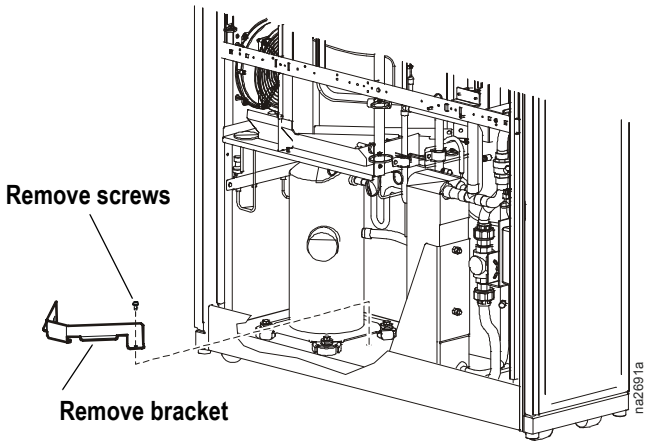
Positioning the Equipment

Remove the compressor shipping bracket

Caution: Failure to complete the following steps may result in equipment damage and will void your warranty.

The compressor is secured by a bracket to prevent damage during shipping. This bracket must be removed before you apply power to the equipment.

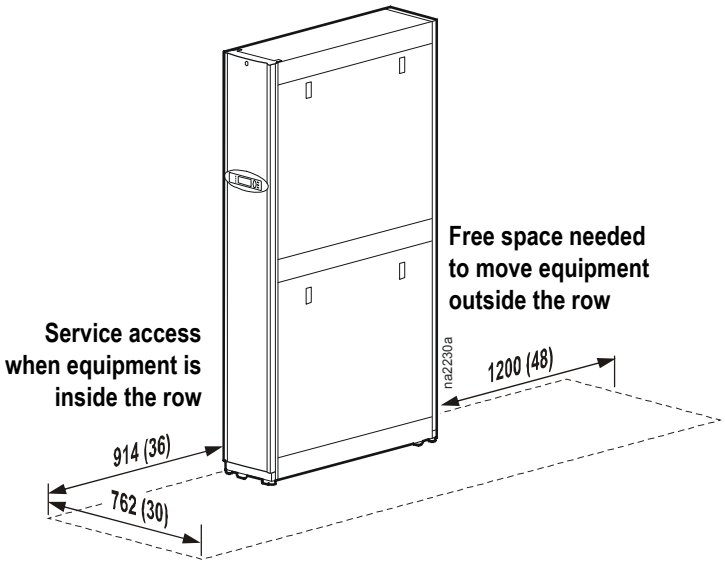
1. Remove two T30 Torx screws from the bracket as shown. Save the screws for possible future use.
2. Remove the bracket and save for possible future use.



Service access

A minimum 900 mm (36 in) of clear floor space in front of and behind the equipment is recommended for service. All required periodic maintenance can be performed from the front or rear of the equipment.

Most of the cooling components in the equipment (e.g. dry filter, sight glass, solenoid, and expansion valves) must be soldered for repair or replacement. Do not service these components while the equipment is located inside the data center. Use the casters on the equipment to move it outside the data center for service. A minimum of 1200 mm (48 in) of clear floor space in front of or behind the equipment is recommended to roll out the equipment.


Free space needed to move equipment outside the row
Service access when equipment is inside the row
1200 (48)
914 (36)
762 (30)
na2230a

Dimensions are shown in mm (in).

Note: Check local and national codes and regulations for additional service access requirements.

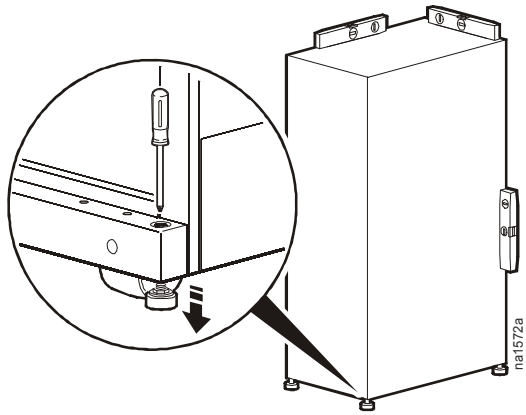
Leveling the Equipment

Note: The leveling feet at the corners of the equipment provide a stable base if the floor is uneven, but they cannot compensate for a badly sloped surface.

1. Remove the front and rear doors. See “Door removal” on page 13.

   Note: Before removing the front door, unplug any wires that may interfere with the removal of the doors.

2. For each leveling foot, insert a Phillips PH2 or slotted screwdriver into the screw above the leveling foot. Turn the screw clockwise to extend the leveling foot until it makes firm contact with the floor.



3. Re-install the front and rear doors.

   Caution: After re-installing the front door, reconnect all wire previously disconnected.

   Note: Use a 13-mm open-ended wrench to level the equipment without removing the doors.

Stabilizing the Equipment

Floor brackets

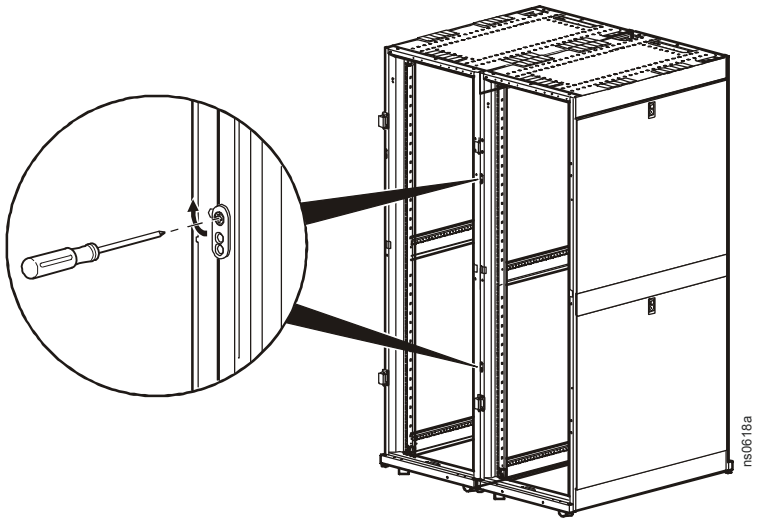
To prevent the equipment from moving from its final location (if it is not joined with an enclosure), use the included bolt-down kit (AR7701). Follow the installation instructions included with the kit.

Joining the Equipment to Enclosures

Joining to SX enclosures

The equipment comes with four joining brackets (two for the front and two for the rear).

1. Remove the front and rear doors. See “Door removal” on page 13.
2. Locate the four joining brackets. Rotate each bracket ninety degrees toward the adjoining enclosure so the bracket is parallel to the floor and install using the screws provided with the enclosure.



For more information, see the *Unpacking, Installation, and Customization* manual for the NetShelter® SX Enclosure.

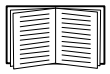
Joining to VX and VS enclosures

For information on joining the equipment to VX and VS enclosures, see the installation sheet *NetShelter® SX or VS External Joining Kit—AR7601, AR7602.*

Mechanical Connections

Refrigeration piping

The equipment must be connected to a condenser—either a remote outdoor condenser or an indoor centrifugal condenser. Systems with remote outdoor or indoor centrifugal condensers will require discharge and liquid lines from the equipment to the condenser. Install all refrigerant lines in accordance with applicable industry guidelines as well as local and national codes and regulations.



To size lines, see “Recommended line sizes” on page 18.

Calculate an equivalent length based on the actual linear length of the run, including valves and fittings.

Note: All fittings should be long-radius to minimize pressure drop.

Discharge lines are sized such that velocity in vertical lines is between 5 m/s (1000 ft/min) and 15 m/s (3000 ft/m). Limit the velocity in horizontal lines to 2.5 m/s (500 ft/min). The refrigerant velocity must be high enough to keep oil entrained in the flow. If it is too low, oil will not return to the compressor. If the refrigerant velocity is too high, both the noise level and pressure drop will increase. Pressure drops of up to 0.7 bar (10 psi) in discharge lines are acceptable.

Note: Fully loaded, the nominal cooling capacity of the equipment is 10 kW. At its lowest speed, the equipment cooling capacity is approximately 2 kW.

Note: Give consideration to the loaded and unloaded state of the compressor to ensure that the operational range stays within these limits.

Note: Change the size of the pipe before the P-trap. See “Refrigeration Piping Diagram” on page 10.

Make all refrigerant lines as short and direct as possible. Horizontal discharge lines must a minimum downward pitch of 4 mm per m (1/2 in per 10 ft) in the flow direction to aid in oil return. Install traps in the vertical discharge lines approximately every 6 m (20 ft) to ensure proper oil return. Traps are normally not necessary at the base of discharge lines; however, loop the line to the floor before running it vertically to prevent the drainage of oil back to the compressor during shutdown periods.

Isolate piping from structural surfaces using vibration clamps.

Note: Install all piping in accordance with applicable industry guidelines as well as local and national codes and regulations.

ASHRAE standards for equivalent piping lengths of fittings and valves

	Type of fitting or valve—Equivalent length of pipe in m (ft)				
ACR pipe size, OD	**Gate valve**	**Standard elbow 90°**	**Reduced coupling**	**Side outlet T**	**Angle valve**
1/2 in	0.18 (0.6)	0.43 (1.4)	0.43 (1.4)	0.82 (2.7)	1.83 (6.0)
5/8 in	0.21 (0.7)	0.49 (1.6)	0.49 (1.6)	0.91 (3.0)	2.13 (7.0)

Recommended line sizes

Equivalent length m (ft)	Line type	ACRD100, ACRD101 (OD)
15 (50)	Discharge line (horizontal)	5/8 in ACR
	Discharge line (vertical)	1/2 in ACR
	Liquid line	1/2 in ACR
30 (100)	Discharge line (horizontal)	5/8 in ACR
	Discharge line (vertical)	1/2 in ACR
	Liquid line	1/2 in ACR
46 (150)	Discharge line (horizontal)	5/8 in ACR
	Discharge line (vertical)	1/2 in ACR
	Liquid line	1/2 in ACR

Note: All refrigerant pipes must be straight ACR to have 565 psig or above MWP.
Note: The Equivalent Length of 1/2 in OD discharge line pipe should be kept to less than 18 m (60 ft).
Note: The Total Equivalent Length of discharge line should be less than 46 m (150 ft) to prevent an excessive hot gas pressure drop which can increase the discharge pressure during hot summer days.
Note: To have a Total Equivalent Length of 61 m (200 ft), the load must be reduced by 5%.

Connect refrigerant lines

Be sure to use only clean, refrigerant-grade (ACR Type L) pipe and follow standard procedures for pipe size selection for air-cooled equipment. The maximum allowable equivalent length between the evaporator and condenser is 61 equivalent m (200 equivalent ft). Vertical runs (hot gas) require a trap every 6 m (20 ft) of rise.

Note: When brazing field-installed copper refrigeration lines, use a nitrogen purge to minimize contamination of the refrigeration system during the brazing process.

The air-cooled equipment has been dehydrated at the factory and is shipped with a holding charge of 207 kPa (30 psig) nitrogen. Test refrigerant connections for leaks before replacing the holding charge.

Connect both refrigerant lines to the equipment, using provided fittings. See “Install kit” on page 4.

Condenser

Install and pipe the condenser in accordance with the provided instructions.

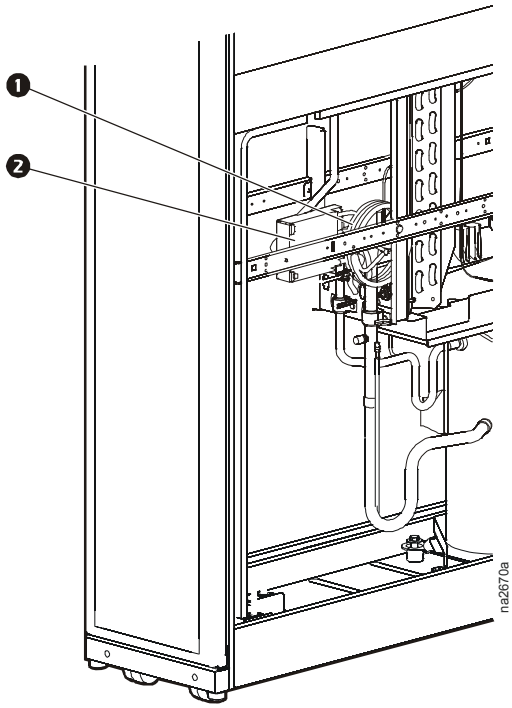
Flooded receiver

Install the flooded receiver in accordance with the instructions included with the kit.

Note: Install a 3/8" Schrader port on the liquid line outlet of the flooded receiver, approximately 152 mm (6 in) downstream of the service port.

Condensate pump

The condensate pumps ❷ are factory-wired and piped internally to the condensate pan. The pumps are capable of moving liquid a maximum of 15.2 m (50.0 ft), which may include a maximum lift of 4.9 m (16.0 ft) as measured from floor level. For example, if your lift is 3 m (10 ft), you only have 12.2 m (40.0 ft) of usable run remaining. The pumps also use on-board condensate high level float switches, which are wired into the alarm input for local and remote alarm capabilities.



Condensate pump drain connection. Sufficient PVC drain line ❶ is supplied to route the drain to the outside of the equipment. Provide additional drain line at installation to allow routing to a remote drain.

Caution: Do not leave the condensate drain line coiled inside the unit. Route the condensate line out the top or bottom of the unit.

Caution: Do not exceed the lift or the run length of the drain system.

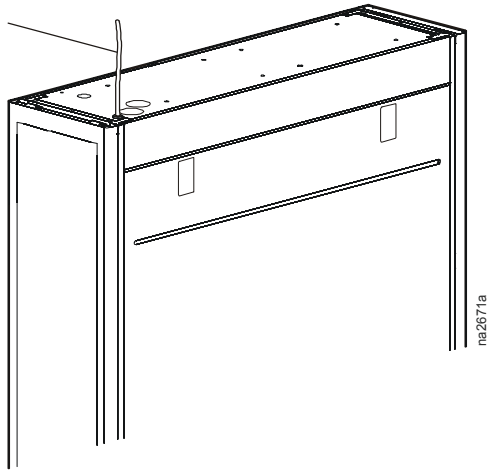
Routing the condensate pump drain line.

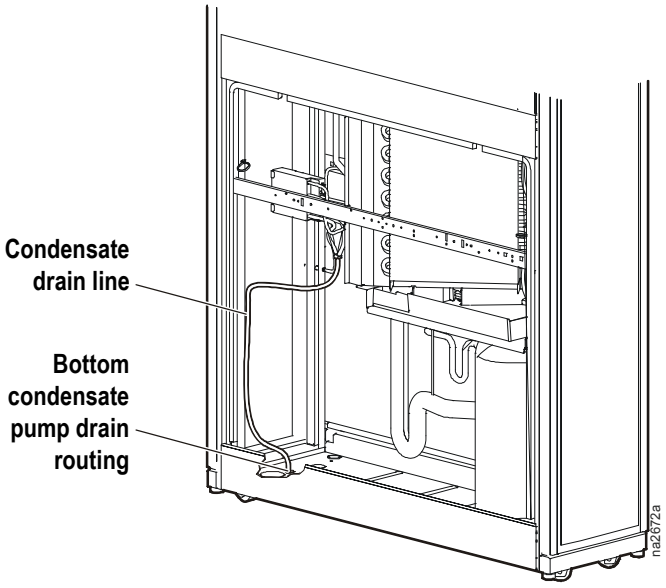
Route the condensate drain line through the top or the bottom of the equipment to an appropriate drain.

Note: Comply with all local codes when installing the condensate drain line to the drain system.

Caution: Failure to properly route condensate drain line before operation could result in water damage.

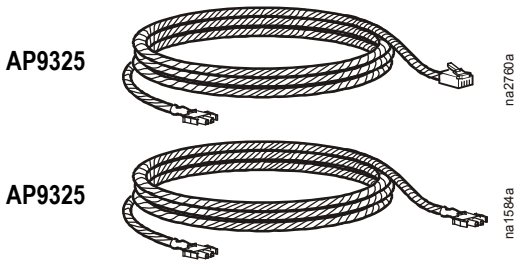
Top condensate pump drain routing



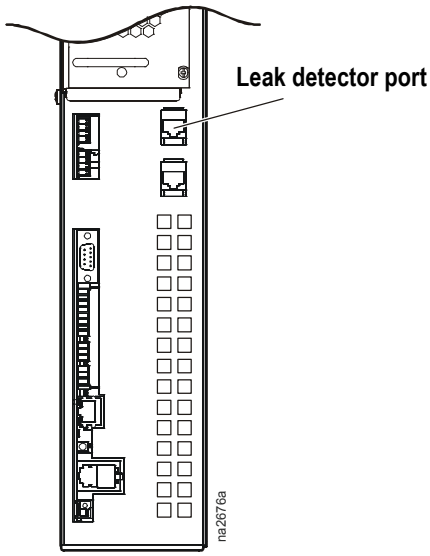


Leak sensor (optional)

Install one leak sensor (AP9325). To extend the leak sensor length, add up to three additional leak sensors (AP9326).



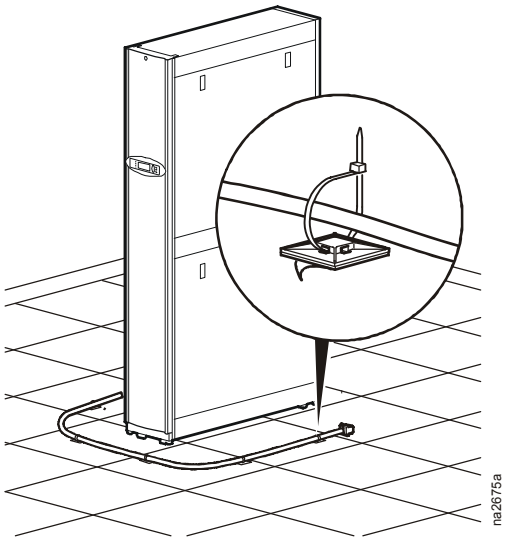
1. Connect the leak sensor to the equipment using the leak detector port as shown.



2. Position the leak sensor inside or outside the equipment.

   Note: Install leak sensors on a clean surface, and do not allow them to touch metal that is in an air stream.

3. Route the leak sensor to the outside through either the bottom plate or the door.
4. Secure the leak sensor wire to surfaces using cable ties and cable tie holders (provided with the leak detector).



Adding a holding charge

R-410A is a mixed refrigerant. When charging this equipment with mixed refrigerant, only liquid refrigerant must be charged.

Caution: Failure to charge with liquid refrigerant may damage the system.

Note: The equipment is to be charged with R-410A only. It is the responsibility of the installing contractor to provide sufficient refrigerant for a complete system charge during start-up.

Note: It is very important to make a note of the amount of R-410A used in this pre-charge

Note: It is recommended that the isolation valve assembly accessory (ACAC10022) be installed to facilitate moving the equipment after installation.

1. If installed, open the two shutoff valves above or below the equipment. Do not close the valves unless there is a need to remove the incoming piping.
2. Pressurize the system to 17.2 bar (250 psi) with nitrogen. Leave the system pressurized for 24 hours (recommended), and then check the gauges for a drop in pressure.
3. Use a deep vacuum pump and pull the first vacuum down to 750 microns. Wait for an hour (vacuum should not rise above 1500 microns) and then break the vacuum with nitrogen.
4. Pull a final vacuum down to 300 microns for a minimum of 2 hours.

   Caution: Install a ball valve before the micron gauge to prevent damage to the micron gauge during charging.
5. Using the charging table, calculate the total charge needed, then charge to 80% of that total. See “Charging Table” on page 23.
6. Record the amount of refrigerant used so the charge can be completed later.
7. Charge with liquid R-410A until the system pressure equalizes with the refrigerant canister.
   a. Apply the charge into the liquid line service port inside the equipment.
   b. Purge the refrigerant hoses and manifold set.

Adding compressor oil

Depending upon piping run lengths, the system may require an additional charge of oil at start-up. The installing contractor shall provide adequate compressor (POE) oil.

Charging Table

Condenser Model	Selected Ambient Temperature	Condenser Summer Charge (lb)	Condenser Flooded Charge (lb) for Different Minimum Outdoor Ambient Temperatures				
			4° C (40° F)	-7° C (20° F)	-18° C (0° F)	-29° C (-20° F)	-40° C (-40° F)
ACCD75214	95° F	4.9	12.1	12.9	13.3	13.6	13.9
ACCD5214	105° F	4.9	12.1	12.9	13.3	13.6	13.9
ACCD75215	115° F	8.5	21.1	22.4	23.1	23.6	24.1
ACCD75216	35° C	3	6.8	7.2	7.4	7.6	7.7
ACCD75218, ACCD75220*	40° C	3	6.8	7.2	7.4	7.6	7.7
ACCD75217, ACCD75219	46° C	5	13.5	14.4	14.8	15.2	15.5

* ACCD75220 is CCC certified for use in China.

Total Charge - RD Unit Charge + Condenser Summer Charge + Condenser Flooded Charge (for minimum possible ambient temperature) + Liquid R410A in liquid pipe

RD Unit Charge is 1.6 kg (3.5 lbs)

Density of liquid R410a at 105° F 260 psig is 61.0 lbm/ft^3

Cross sectional area for 1/2 inch OD ACR pipe is 0.0010554 ft^2
R410A in 1/2 OD liquid line - Area x Length in ft x density - 0.0010554 (ft^2) x L (ft) x 61.0 (lbm/ft^3)
Liquid line charge for 1/2 inch OD ACR copper tube is 0.095 kg/m (0.0644 lb/ft)

Cross sectional area for 5/8 inch OD ACR pipe is 0.001619 ft^2
R410A in 5/8 OD liquid line - Area x Length in ft x density - 0.001619 (ft^2) x L (ft) x 61.0 (lbm/ft^3)
Liquid line charge for 5/8 inch OD ACR copper tube is 0.146 kg/m (0.099 lb/ft)

Example: Calculate total R410A charge for FCB5, 25 ft long 1/2 in OD liquid piping and minimum outdoor design temperature is 20° F.
Total R410A charge = 3.5 + 4.9 + 13.6 + (25 (0.0644)) = 23.6 lb.

Electrical Connections

The electrical connections required in the field are:

- Controls (display interface, Network Management Card)
- Communication (A-Link, Building Management System)
- Power to InRow RD (single phase plus ground)
- Power to flooded receiver heater

All electrical connections must be in accordance with applicable industry guidelines as well as national and local codes and regulations.

See the equipment nameplate for voltage and current requirements.

Make all low-voltage connections, including data and control connections, with properly insulated wires. Insulation of low-voltage wiring must be rated for at least the voltage of any adjacent wiring.

Electrical Hazard: Potentially dangerous and lethal voltages exist within this equipment. More than one disconnect switch may be required to energize or de-energize this equipment. Observe all cautions and warnings. Failure to do so could result in serious injury or death. Only qualified service and maintenance personnel may work on this equipment.

Electrical Hazard: The equipment must be grounded. Check the equipment nameplate for correct ratings.

Warning: Use a voltmeter to ensure that power is turned off before making any electrical connections.

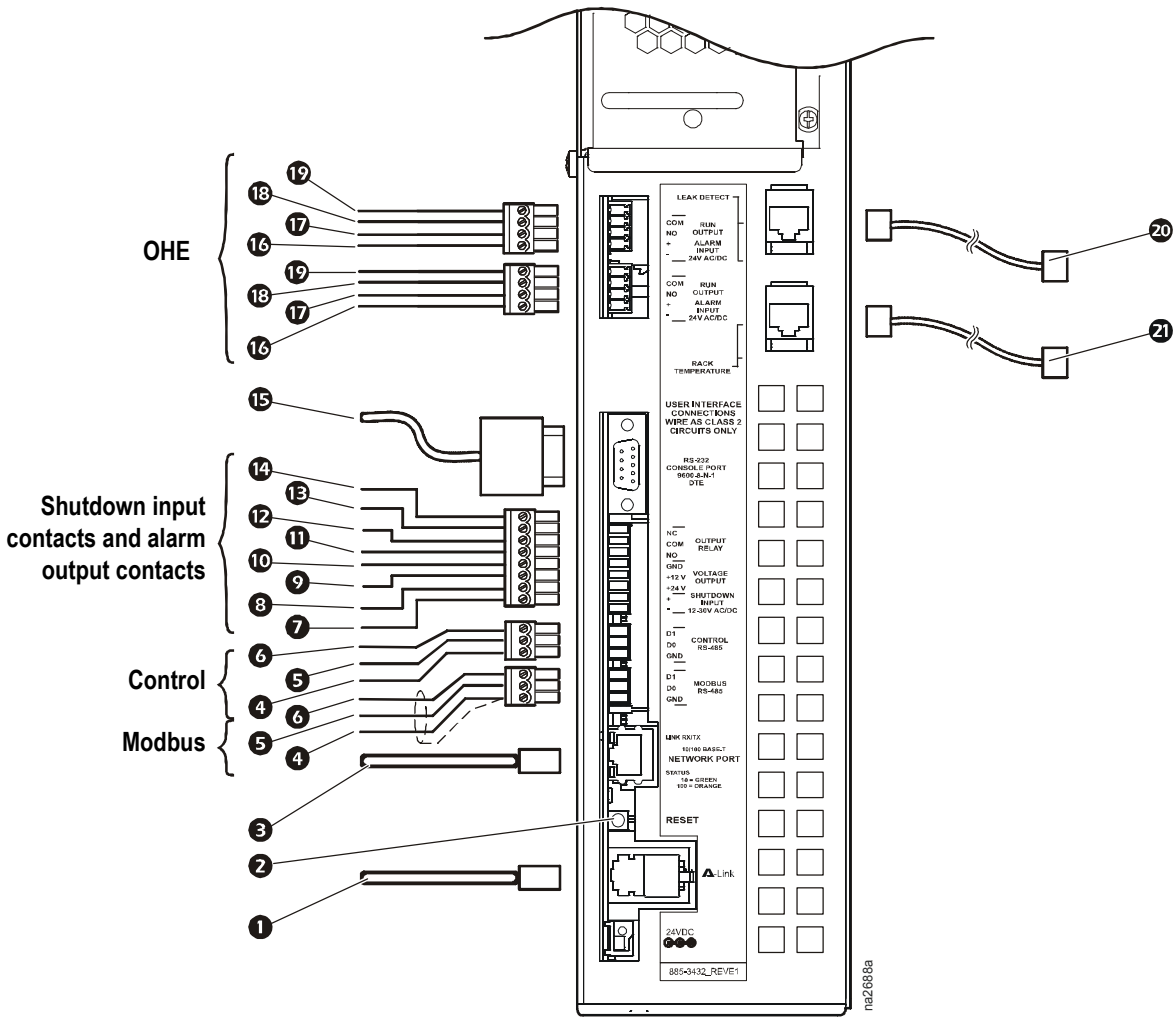
Note: FOR INSTALLATION IN CHINA ONLY - 至少需要一个不小于 3㎜ 触点开距的全极断开装置，以便对此设备进行通电和断电。

Control connections

Note: Wire all low voltage input and output connections as Class 2 circuits.

Depending on the configuration, additional control connections may be required for the A-Link remote communications through APC Network Management Card support or traditional equipment-monitoring software.

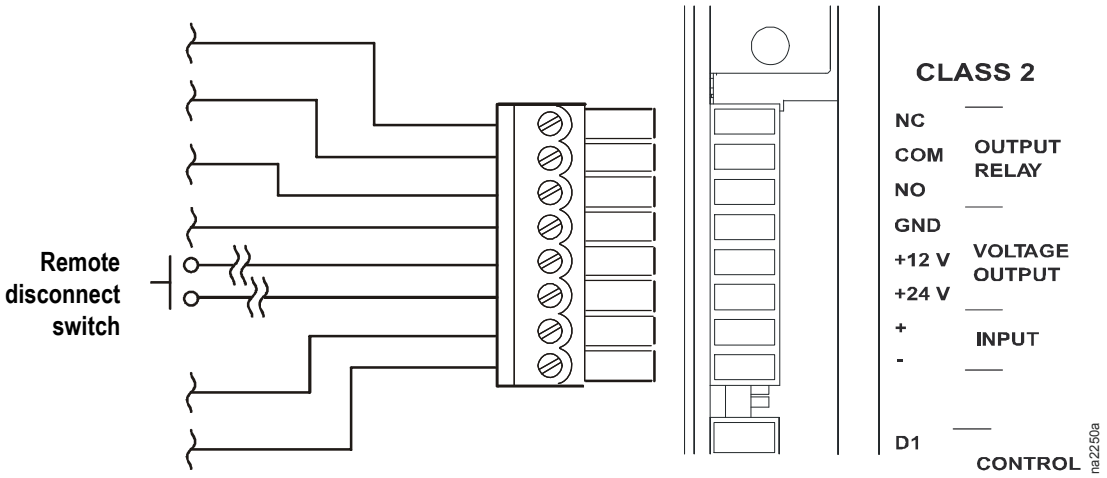
User interface connections



❶	A-Link ports: Pin 1 = High; pin 2 = Low; Pins 3,6 = Perf Power; Pins 4, 5 = Ground	⓬	NO (normally open contact)
❷	Reset button	⓭	COM (common contact)
❸	Network port	⓮	NC (normally closed contact)
❹	Shield/ground	⓯	RS-232 console port
❺	A- = True	⓰	OHE (outdoor heat exchanger) alarm input - (not used)
❻	B+ = True	⓱	OHE alarm input + (not used)
❼	Shutdown -	⓲	OHE COM (optional*)
❽	Shutdown +	⓳	OHE NO port (optional*)
❾	24 VDC (bias)	⓴	Leak detector port (AP9325)
❿	12 VDC (bias)	㉑	Remote temperature sensor
⓫	Return (bias)		

* To avoid unnecessary condenser operation when the ambient temperature exceeds 43° C (110° F), connect these leads.

Form C alarm contacts and shutdown input



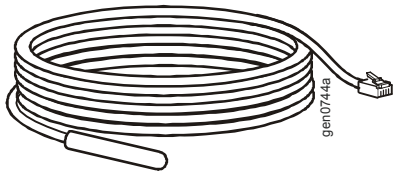
See items 6 through 13 in “User interface connections” on page 25. A relay internal to the user interface is controlled by a user-defined alarm (for example, malfunctioning fans). Before an alarm condition, the signal on the COM (common) terminal is routed to the NC (normally closed) terminal. When the alarm is activated, the relay is energized, causing the signal on the COM terminal to be routed to the NO (normally open) terminal. The NO and NC terminals could be connected to remote indicator lights, a warning buzzer, or another device to alert an operator to the presence of an alarm condition.

A remote disconnect switch can be connected to the shutdown inputs as shown.

Note: Either +12 VDC or +24 VDC can be used to power the remote disconnect.

Rack temperature sensor

The rack temperature sensor monitors and controls the equipment airflow and ensures an adequate supply of cooling air to the server racks in the data center.

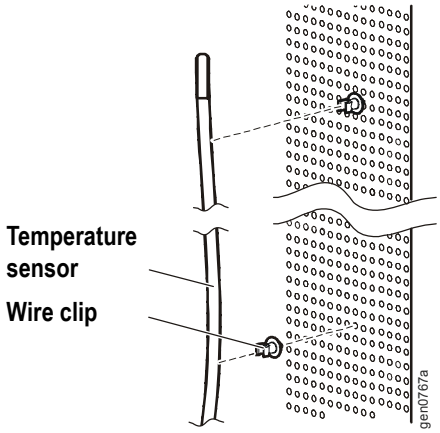


The equipment is supplied with an external rack temperature sensor. See “Install kit” on page 4. This sensor, along with wire clamps and wire clips, are included in the installation kit shipped with the equipment.

Installing the rack temperature sensor

Note: Rack temperature sensor installation is not required if the equipment operates in Rack Air Containment System (RACS) or Hot Aisle Containment System (HACS) mode. The InRow configuration requires temperature sensor installation.

1. Insert the rack temperature sensor connector in the temperature sensor port at the user interface. See “User interface connections” on page 25.
   a. For a top installation, push the rack temperature sensor through the port located at the top of the equipment.
   b. For a bottom installation, route the sensor through the access hole in the bottom of the equipment.
2. Route the sensor through either the top or the bottom of the adjacent server rack.
3. Secure the temperature sensor cable to the front door of the adjacent server rack at multiple locations using the provided wire clips as shown. See “Install kit” on page 4.



Install the sensor where lack of sufficient cooling air is most likely. The optimum position of the rack temperature sensor will vary from installation to installation, but must be located in the airflow to allow proper readings.
Servers most likely to have insufficient or inadequately cooled air due to the recirculation of hot air from the hot aisle include:

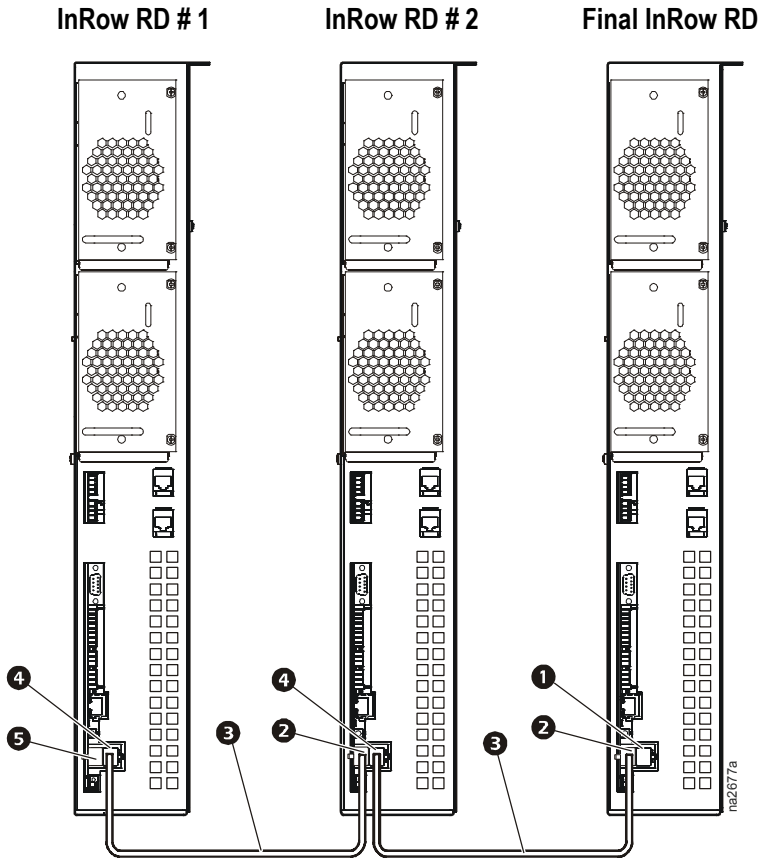
a. Servers positioned at the top of a rack.
b. Servers positioned at any height in the last rack at an open end of a row.
c. Servers positioned behind flow-impairing obstacles such as building elements.
d. Servers positioned in a bank of high-density racks.
e. Servers positioned next to racks with Air Removal Units (ARU).
f. Servers positioned very far from the equipment.
g. Servers positioned very close to the equipment.

A-Link connections

The A-Link bus connection allows multiple InRow RD equipment (up to twelve) to communicate with one another. Only one InRow RD must be defined through the display interface; other InRow RDs are numbered automatically.

To enable the InRow RDs to work as a group, link them using the supplied cables, or CAT-5 cables with RJ-45 connectors. A terminator (150 Ohm, 1/4 W) is installed in the A-Link port, and must remain inserted into the A-Link ports of the first and final InRow RDs only.

The maximum wire length for the entire group may not exceed 1,000 m (3,280 ft).



❶ A-Link out port (with provided RJ-45 terminator)

❷ A-Link in port

❸ A-Link cable (CAT-5 ethernet cable)

❹ A-Link out port

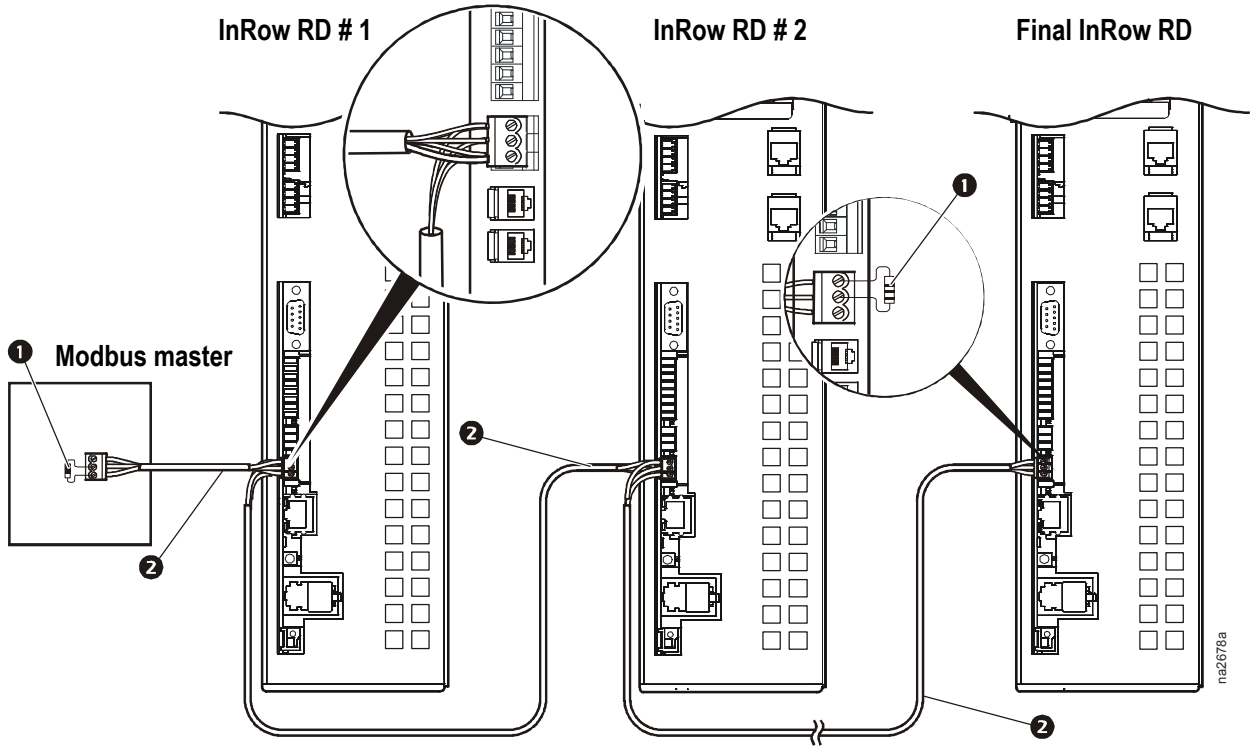
❺ A-Link in port (with provided RJ-45 terminator)

Building Management System (BMS)

The Modbus interface allows each InRow RD to communicate with the BMS. Use a three-wire cable to connect each InRow RD in turn. Wire a 150 Ohm, 1/4-W terminator resistor (included) into the MODBUS master and the final InRow RD between Modbus D0 and Modbus D1.

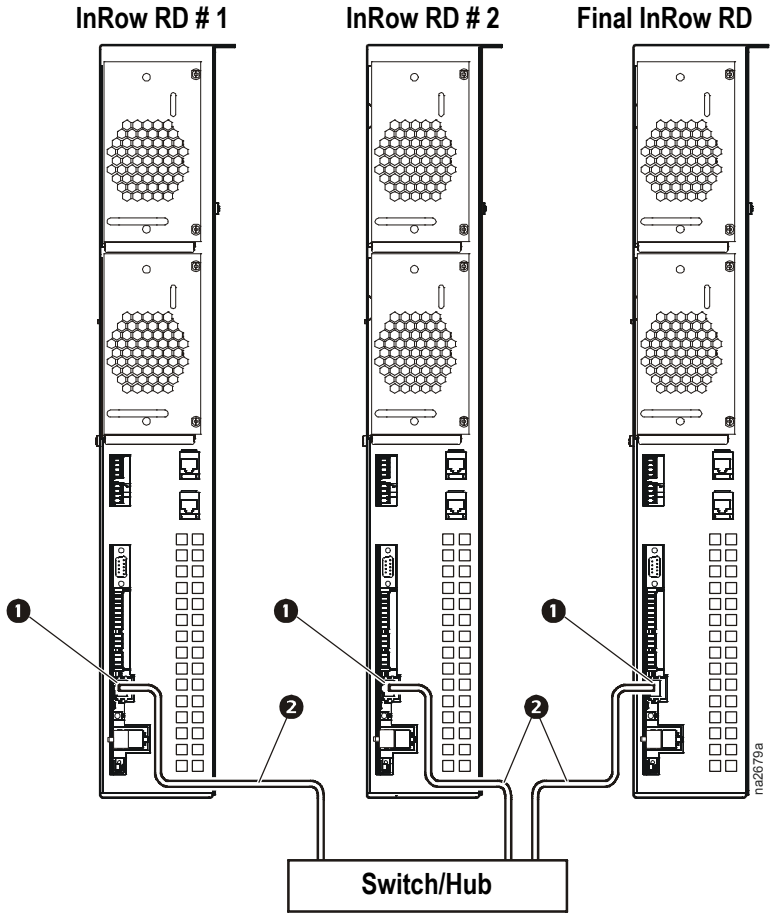
Each InRow RD has a three-wire Modbus terminal on the user interface. Use a connector with screw terminals to allow wiring to be attached. See “User interface connections” on page 25 for specific layout of the user interface.

For information on setup of Modbus parameters, see the *InRow RD Operation* manual.



1. Termination resistor (provided)
2. Modbus cable (RS-485)

Network port



1. Network port
2. LAN cable (10/100 Base-T)

Power Connections

Wiring configurations

Route incoming power to the electrical junction box located at the top or bottom of the equipment.

Electrical Hazard: Only a licensed electrician may connect the equipment to utility power.

Lock out and tag out all power sources before working with electrical wiring.

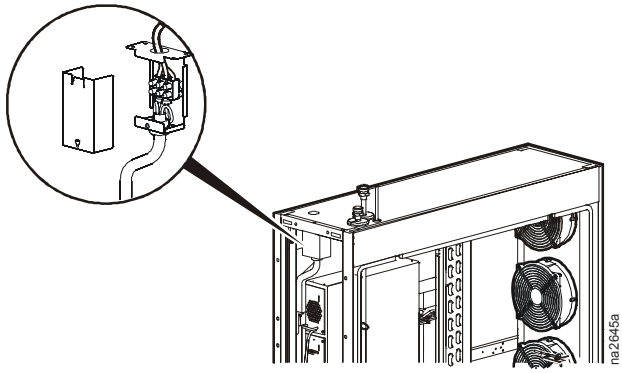
Do not wear jewelry when working near energized components.

Observe all local and national electrical codes.

Note: To ease installation and future removal of the equipment for repairs, use flexible conduit for the power wiring.

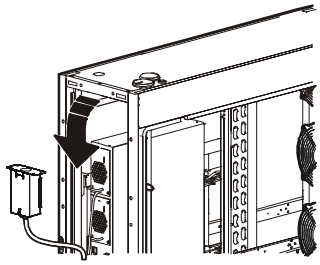
Top routing

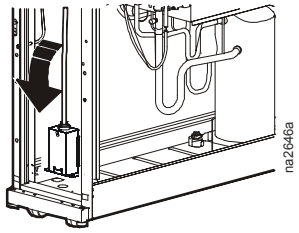
1. Remove the electrical junction box cover.
2. Route electrical cabling into the electrical junction box as shown.
3. Secure the incoming cable with a standard 20 mm (3/4-in) nominal conduit strain relief (not provided).
4. Connect the power wiring to the terminals as shown and torque the screws to the value shown on the label.
5. Reinstall the electrical junction box cover.



Bottom routing

1. Carefully clip all the cable clamps that secure the electrical cable to the cabinet frame. Remove the cable clamps from the cabinet and discard.
2. Remove two screws securing the electrical junction box to the underside of the cabinet top.
3. Remove the plug from the cabinet floor and insert it in the cabinet top.
4. Turn the electrical junction box over and secure it to the bottom of the cabinet using the screws removed in step 1. See “Bottom piping and power access locations” on page 9.
5. Secure the electrical cable to the cabinet frame using new cable clamps (supplied).
6. To connect electrical power, follow the steps for top routing.





Connect flooded receiver heater

The flooded receiver is equipped with a heater to keep the refrigerant warm during extremely cold weather conditions. The heater requires 208 - 240/1~/60 Hz electrical service to be wired to the condenser electrical panel (see submittal drawings for details).

Warning: Make electrical connections in accordance with all local and national codes.

Radio Frequency Interference

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

USA—FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this user manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference. The user will bear sole responsibility for correcting such interference.

Canada—ICES

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Japan—VCCI

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準
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るように要求されることがあります。

Taiwan—BSMI

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  - **www.apc.com/support/**
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